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# MINOR STUDY FROM THE PSYCHOLOGICAL LABORATORY OF STANFORD UNIVERSITY

A NEW TAPPING INSTRUMENT FOR LABORATORY USE

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By GERTRUDE M. TRACE

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The development of this new tapping instrument came about through dissatisfaction with the tapping-board and the telegraph key as apparatus for class work. Having found the tapping experiment valuable as a basis for class discussion of practice and fatigue, a search was begun for a reaction instrument which would be inexpensive, eliminate noise, simplify calibration, be consistent in its behavior, be easily handled by large classes with a minimum of variation in procedure, and at the same time present ample introspective material for analysis.

Pneumatic apparatus was first considered, and was discarded chiefly because it took an apparently interminable time to bring about either objective or subjective indications of fatigue. This added another requisite for the instrument: it must bring about fatigue quickly and yet not leave the reagent with sore muscles, or prolong too much the period of rest between records. After about a year's experimentation (1915-1916), an instrument was evolved which has been used by several classes with fair results.

The instrument is light and small, the weight being 50 grams and the length 10.5 cm. The two steel prongs, curved and lined with rubber at the ends to fit the thumb and finger, are 1.5 cm. wide and 7.2 cm. long. The distance between prongs is 2 cm. and it requires a pressure of 1250 grams to bring one into contact with the other, the thumb and finger being then 4 mm. apart. The instrument can be raised or lowered to meet the needs of the reagents; it can be used in either the horizontal or the vertical position.

An electric time-maker in circuit with the instrument records the taps upon the smoked paper on a Zimmerman kymograph, the drum of which revolves once in sixty seconds. The time is checked by a spring time-marker beating quarter-seconds.

The method used is similar to that used by Wells,<sup>1</sup> the results for the 30-second series being tabulated in 5-second intervals, together with the sum, average and fatigue index. A group of non-selected students give the following averages for 33 series: For the 5-second interval the average was 20.9 taps and the median 20.86; for the series the average fatigue index is .83, and the average loss 7.0 taps.

The uniformity of behavior (indicated by the closeness of the average and the median), the quietness, the easy adjustment, make the

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<sup>1</sup> F. L. Wells, Normal Performance in the Tapping Test Before and During Practice, with Special Reference to Fatigue Phenomena. *American Journal of Psychology*, XIX, 1908, pp. 437-483.

instrument useful for large classes, and especially so as it brings about acute fatigue rapidly, the effects of which, however, vanish with the release of the prongs. It has the additional advantage in that the tapping rate is so much slower than with the tapping-board and the telegraph key that the reagent is able to note the changes in the rate and character of the tapping and the accompanying fatigue. This introspective phase is a valuable addition to the tapping experiment.

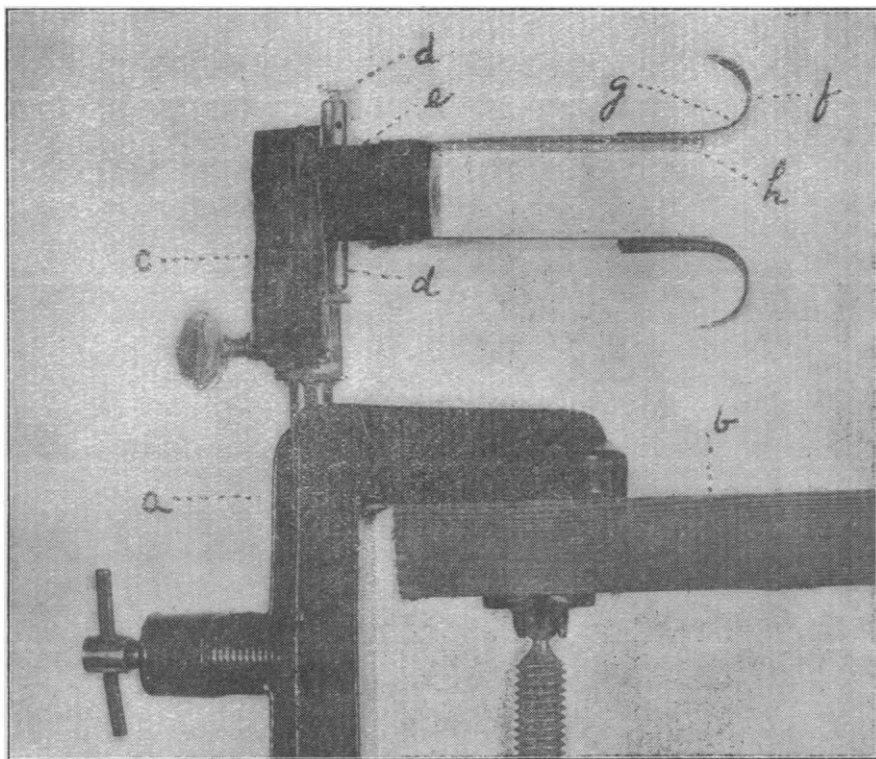


FIGURE 1. Photograph of the tapping instrument. a, table clamp; b, table; c, parallel clamp; d, binding posts; e, hard rubber base; f, steel prongs; g, soft rubber lining; h, steel contacts connected with binding posts and insulated from prongs.